Mr. Elliot's system, the other in the fashion followed by any reasonable farmer in the district. In fact, the book proves nothing more than that Mr. Elliot, by using good seed and looking carefully after his grass land, has improved his farm in his own opinion and in that of various of his visitors; otherwise the book is a farrago of irresponsible talk, of hard words for agricultural chemists and science generally, of diatribes against the Board of Agriculture and everyone else who does not see eye to eye with Mr. Elliot; it bears every mark, in fact, of the work of the man with one idea.

SOCIOLOGY.

Sociological Papers Published for the Sociological Society. Pp. xviii+292. (London: Macmillan and Co., Ltd., 1905.) Price 10*s.* 6*d.*

THESE papers, the *Transactions* of the Sociological Society, make known to the world what work the society has done during the first year of its existence, and explain the aim and scope of the work it hopes to do in the future.

The first paper recounts the history of the word sociology. After that we get to the fundamental question of eugenics, "the science which deals with all the influences that improve the inborn qualities of the race; also with those that develop them to the utmost advantage." Mr. Francis Galton, the author of this paper, would have the principles of eugenics "introduced into the national conscience, like a new religion," that so a fine race may be bred. The discussion that followed was very interesting. The view held by most medical men who have reached middle age was put without any qualification, the view that we cannot attempt to deal with "a mass of scientific questions affecting heredity," but that we must concentrate our attention on more practical questions, such as the feeding of infants. Mr. Archdall Reid, on the other hand, in a written communication, brings out with admirable lucidity the distinction between degeneracy properly so called and the defective development of the individual. These questions, both of them urgent, we must face. "In the first place we must improve the conditions under which the individual develops, and so make him a fine animal. In the second place we must endeavour to restrict as far as possible the marriage of the physically and mentally unfit." Mr. Reid might have gone on to say that the former method without the latter, the improvement of external conditions without any check upon the multiplication of the unfit, would merely hasten degeneration, as any slackening in the stringency of natural selection must inevitably do. Mr. Bateson declines to join in investigations carried on by the "actuarial" method, preferring experimental breeding with its more definite results. But is it possible to experiment with human beings?

Prof. Geddes, in his "Civics," recommends to students a geographical survey of some river basin in which is displayed the evolutionary process which, beginning with "hunting desolations" on the hill-tops, culminates in some great manufacturing city that darkens the heavens with its smoke. It is doubtful how far this method can afford definitely practical help in solving the problems of modern industrial society. Still, the historical method is capable of imparting an interest to a science which to not a few men is dismal, and certainly anything that can make our great cities interesting is to be welcomed. Dr. E. Westermarck investigates the position of woman in early civilisation, showing that she was by no means, as a rule, a slave and a nonentity, but he owns that "the condition of women or their relative independence is by no means a safe gauge of the culture of a nation." Mr. P. H. Mann follows with a paper on "Life in an Agricultural Village in England," an investigation of the economic condition of the inhabitants. He follows the method of Mr. Charles Booth and Mr. Rowntree in the study of city populations. Prof. Durkheim and Mr. Branford discuss the relation of sociology to the social sciences and to philosophy. Prof. Durkheim contends that sociology is not a mere organisation of more specialist sciences, but that it is capable of remodelling them. Historians, for instance, and political economists have already had to "reorient their studies."

In conclusion, we must congratulate the Sociological Society on its first year's work. Beyond the work which can be definitely gauged there has been the bringing together of men who hold very different views, and of men who are attacking the same great problem from different sides. F. W. H.

OUR BOOK SHELF.

First Report of the Wellcome Research Laboratories at the Gordon Memorial College, Khartoum. By the Director, Andrew Balfour, M.D., B.Sc., &c. (Khartoum: Department of Education, Sudan Government, 1904.)

THE Wellcome Research Laboratories of the Gordon College, Khartoum, which were equipped by the munificence of Mr. Henry S. Wellcome, have certainly justified their existence, judging by the record of work done during the year February, 1903, to February, 1904, as detailed in the report of the director, Dr. Andrew Balfour.

The volume commences with a brief description of the laboratories, after which follows an account of the various researches that have been carried out in them.

Any medical director stationed where malaria is endemic and mosquitoes plentiful would at once direct his attention to the distribution of the latter, and institute measures to diminish their prevalence. This has been done by Dr. Balfour, and the first article is devoted to a description of his observations and administration in this respect. Of mosquitoes three species are particularly numerous, *C. fatigans,* an anophelina, *P. costalis,* and *Stegomyia fasciata.* Mosquito brigades have been organised, and anti-malarial measures conducted on the lines recommended by Ross, and there appears to be every probability that the prevalence of mosquitoes will be greatly diminished in Khartoum in the near future. Collections of mosquitoes have been received from various parts of Egypt, the Sudan, and Abyssinia, and have been examined and named by Mr. Theobald, who contributes an article descriptive of the species, many of which

are new. Experiments were made on the use of an anilin dye, chrysordine, for the extermination of mossuito larvæ and pupæ. It was found to act satisfactorily in a dilution of 1 in 30,000, but for practical purposes its use in this strength would be prohibitive on account both of cost and of its yellow colour. Biting and noxious insects other than mosquitoes is the subject of the next article, the most interesting find being *G. morsitans*, the tsetse fly which carries nagana, on the Pongo River, Bahr-el-Ghazal, and a few pages are devoted to insects and vegetable parasites injurious to crops, the most important being an aphis destructive to the dura crop described by Mr. Theobald as *Aphis sorghi* (nov. sp.). Cyanogenesis, hydrocyanic production, in the dura (*Sorghum vulgare*) is another subject briefly dealt with, and of importance, since considerable loss of horses and cattle has sometimes been occasioned thereby. The dura contains a glucoside which yields hydrocyanic acid on decomposition, the cause of which has been ascribed to abnormal growth, but may be due to the dura aphis as demonstrated by Dr. Balfour.

Lastly, the general routine work, pathological and chemical, of the laboratories is summarised, some interesting notes are given of the various diseases met with in the Sudan, and the occurrence of eosinophilia in Bilharzia disease and dracontiasis is discussed.

We congratulate Dr. Balfour on his first year's work contained in this report, which is copiously illustrated, some of the coloured plates of mosquitoes and other insects being beautifully executed.

R. T. HEWLETT.

Till the Sun Grows Cold. By Maurice Grindon. Pp. 113. (London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd., 1904.) Price 2*s.* 6*d.* net.

THOUGH this story is, so far as its main incidents are concerned, of a familiar kind, it differs from others in that several of the persons described are interested in science. For instance, there is a Sir John Harpur, who "was making important alterations in his Observatory; he was an ardent Astronomer, and F.R.A.S."; Lady Harpur, again, "had a love of flowers beyond that of a botanist, although she was adept in the science"; and the hero, Ralph Hillary, at one time of his life had a workroom "in which he could follow up chemical and other researches to his heart's content." Moreover, after Ralph takes as a second wife his early sweetheart, they engage together in scientific research, and discover a substance of "extraordinary radio-activity" to which they give the name Helenium—after Ralph's sister. We cannot say that the author has been successful in blending fact and fiction together so that one can scarcely be distinguished from the other; yet this art is essential to the writer of scientific romance or romantic science.

A Short Introduction to the Theory of Electrolytic Dissociation. By J. C. Gregory. Pp. 76. (London: Longmans and Co., 1905.) Price 1*s.* 6*d.*

THIS is a useful little book for those students who, after taking a course of systematic chemistry, wish to know something of the behaviour of electrolytic solutions. The language and mode of presentation are simple, and although one might take exception to many points of detail, the book, on the whole, should prove a trustworthy guide. The headings of the four chapters into which the book is divided afford a sufficient indication of its contents:—chapter i., the condition of dissolved substances; chapter ii., ions and precipitation; chapter iii., hydrogen and hydroxyl ions; chapter iv., electrolytic and general considerations.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Electromagnetics in a Moving Dielectric.

SOME time ago, when considering the assumption that the ether inside a body is quite stationary when a body is moved, and that in the application to Maxwell's ethereal equations this involves the use of a fixed time differentiation for the ether, and a moving one for the matter, I argued that the same applied not only to the electric polarisation, as done by Lorentz and by Larmor, but also to the magnetic polarisation. I told the late Prof. FitzGerald that to make the extension seemed to be a sort of categorical imperative. For it involves no assumption as to how the magnetic polarisation is produced. At the time I made the application to plane waves only. Since then I have extended it to the general case. The principal interest at present lies in the mechanical activity, fundamentally involved in the question of the pressure of radiation, and electromagnetic moving forces in general. The results confirm the desirability of applying similar reasoning to the magnetic and to the electric polarisation, in so far as they are relatively simple, and cast light upon the subject.

Thus, let $\mathbf{M}=V\mathbf{DB}$ be the complete *quasi*-momentum per unit volume, and $\mathbf{M}_0=V\mathbf{D}_0\mathbf{B}_0$ the ethereal part. Then if the velocity of the matter is $\mathbf{u}$, and of the ether $\mathbf{q}$, the motional activity (in the absence of free electrification, or variation of the electrical constants in space) comes to

$$\{\mathbf{u}(d/dt)+\nabla(\mathbf{u}.\mathbf{u}\}(\mathbf{M}-\mathbf{M}_0)+\{\mathbf{q}(d/dt)+\nabla(\mathbf{q}.\mathbf{q})\}\mathbf{M}_0\,; \qquad (1)$$

or, in a more developed form,

$$\mathbf{u}\{d/dt+\mathbf{u}\nabla+\nabla\mathbf{u}+\nabla_u\,\mathbf{u}\}(\mathbf{M}-\mathbf{M}_0)+\mathbf{q}\{d/dt+\mathbf{q}\nabla+\nabla\mathbf{q}+\nabla_q.\mathbf{q}\}\mathbf{M}_0. \qquad (2)$$

Here the factor of $\mathbf{u}$ is the moving force on the matter, and that of $\mathbf{q}$ the force on the ether. It will be seen that in the material part we simply deduct that part of the complete $\mathbf{M}$ which does not move with the matter. This makes a great simplification of ideas. To avoid misconception, the ∇ in (1) acts upon all that follows, whereas in (2) the first ∇ acts on the $\mathbf{M}$'s, but the second and third on the velocities only, as may be seen on comparison with (1).

It is necessary, however, to point out distinctly the data involved in the above, as the simplification comes about in a special way. Divide the displacement $\mathbf{D}$ into $\mathbf{D}_0=c_0\mathbf{E}$ in the ether, and $\mathbf{D}_1=c_1\mathbf{E}_1$ in the matter, where $\mathbf{E}_1=\mathbf{E}+\mathbf{e}$, and $\mathbf{e}=V(\mathbf{u}-\mathbf{q})\mathbf{B}_0$. Similarly, divide the induction $\mathbf{B}$ into $\mathbf{B}_0=\mu_0\mathbf{H}$ and $\mathbf{B}_1=\mu_1\mathbf{H}_1$, where $\mathbf{H}_1=\mathbf{H}+\mathbf{h}$, and $\mathbf{h}=V\mathbf{D}_0(\mathbf{u}-\mathbf{q})$. The electric energy is $U_0+U_1=\frac{1}{2}\mathbf{E}\mathbf{D}_0+\frac{1}{2}\mathbf{E}_1\mathbf{D}_1$, and the magnetic energy is $T_0+T_1=\frac{1}{2}\mathbf{H}\mathbf{B}_0+\frac{1}{2}\mathbf{H}_1\mathbf{B}_1$. Also, let there be four æolotropic pressures, of Maxwellian type, say P_0, P_1 electric, and Q_0, Q_1 magnetic. *E.g.* $P_1=U_1-\mathbf{E}_1.\mathbf{D}_1$, meaning a tension U_1 parallel to $\mathbf{E}_1$ combined with equal lateral pressure. The rest are similar. Finally, the two circuital equations are

$$V\nabla(\mathbf{H}-\mathbf{h}_0-\mathbf{h}_1)=\dot{\mathbf{D}}, \qquad -V\nabla(\mathbf{E}-\mathbf{e}_0-\mathbf{e}_1)=\dot{\mathbf{B}}, \qquad (3)$$

where the motional electric and magnetic forces are defined by $\mathbf{h}_0=V\mathbf{D}_0\mathbf{q}$, $\mathbf{h}_1=V\mathbf{D}_1\mathbf{u}$, $\mathbf{e}_0=V\mathbf{q}\mathbf{B}_0$, $\mathbf{e}_1=V\mathbf{u}\mathbf{B}_1$. This completes the data, and from them may be derived the equation of activity

$$-\nabla\{V\mathbf{E}\mathbf{H}+\mathbf{q}(U_0+T_0+P_0+Q_0)+\mathbf{u}(U_1+T_1+P_1+Q_1)\}$$
$$=\dot{U}+\dot{T}+(U_0/c_0)\dot{c}_0+(U_1/c_1)\dot{c}_1+(T_0/\mu_0)\dot{\mu}_0+(T_1/\mu_1)\dot{\mu}_1+\mathbf{F}_0\mathbf{q}+\mathbf{F}_1\mathbf{u}, \qquad (4)$$

where $\mathbf{F}_0$ and $\mathbf{F}_1$ are the forces displayed in (2). The meaning is that the left side of (4) is the convergence of the flux of energy made up of the Poynting flux, the convective flux, and the activity of the pressures, whilst the right side shows the result in increasing the stored energy *and* in work done upon the matter and ether, either, both or neither, according to the size of the two velocities.

The terms involving $\dot{c}$, &c., in (4) represent residual activity which may be of different sorts. The commonest is when the constants vary in space, especially at a boundary. For example, $\dot{c}_1=-\mathbf{u}\nabla.c_1$ if c_1 does not vary